

REMARKS

Initially, Applicants would like to express appreciation to the Examiner for the detailed Official Action provided, and for the acknowledgment of Applicant's Information Disclosure Statement by return of the Form PTO-1449.

However, Applicants note that the Examiner has not acknowledged Applicants' Claim for Priority and receipt of the certified copy of the priority document. It is noted that the Patent Application Information Retrieval (PAIR) system on the U.S. Patent and Trademark Office website reflects Applicants' Claim for Priority in the instant application. Accordingly, the Examiner is requested to acknowledge receipt of Applicants' Claim for Priority and receipt of the certified copy of the priority document in the next Official Action.

Claims 1-4 are currently pending. Applicants respectfully request reconsideration of the outstanding rejection and allowance of claims 1-4 in the present application. Such action is respectfully requested and is now believed to be appropriate and proper.

The Examiner has rejected claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over INOUE et al. (U.S. Patent Appl. Pub. No. 2003/0157404) in view of KAGEYAMA (U.S. Patent Appl. Pub. No. 2001/0006746) and ENDO (JP 2001-155698).

However, Applicants note that INOUE et al., KAGEYAMA, and ENDO fail to teach or suggest the subject matter claimed in claim 1. In particular, claim 1 sets forth a generally oval battery including, inter alia, "a battery case having a generally oval cross section, a generally oval sealing plate, and an electrode plate assembly, said sealing plate having a U-shaped cross section, and said battery having a thickness of 4mm or more and an aspect ratio of 3 or more, wherein an

intersecting point between a circular part and a linear part in an interface between said battery case and the sealing plate acts as a point where breakage occurs for discharge of gas".

Applicants' claimed battery 1 includes a battery case 2, a generally oval sealing plate 3, and an electrode plate assembly, as shown in figure 1. The sealing plate 3 has a U-shaped cross section, as shown in figures 5A and 6A. The battery 1 has a thickness of 4 mm or greater, and an aspect ratio of 3 or more. The aspect ratio is represented by W/T; where W equals the battery width, and T equals the battery thickness. See figure 3.

The battery of the present invention includes an explosion prevention mechanism. The explosion prevention mechanism includes a discharge mechanism in which the weld between the sealing plate 3 and the battery case 2 will selectively break at an intersecting point between a circular part and a linear part of the sealing plate 3, to control gas discharge and prevent explosion.

As shown in figure 2 of the instant application, when the internal pressure in the battery case rises, the battery 1 is deformed. The inventors of the present battery have determined that the battery case 2 and the sealing plate 3 will be deformed in a different manner, depending on the value of the correlation between the aspect ration (W/T) and the battery thickness (T). The inventors have further determined that the weld between the battery case 2 and the sealing plate 3 should be made to break at an intersecting point 7 between a circular part and a linear part of the battery case 2 and sealing plate 3. See figure 3. Thereby, a battery is obtained which will easily discharge gas and prevent explosion, without requiring expensive manufacturing equipment or many processing steps. See at least pages 5-6 of Applicants' specification.

In particular, the inventors have determined that by providing a battery thickness of 4mm or more and an aspect ratio of 3 or more, the battery will consistently break at the intersecting point 7

between the circular part 5 and the linear part 4. See figures 4, 5A, 5B, 6A, 6B, and pages 7-8 of Applicants' specification. Due to the differences in the deformation of the circular part and the linear part, the weld will break at the intersection between the circular part and the linear part. See pages 9-10 of the specification. Accordingly, the breakage of the weld in Applicant's battery is predictable, and controllable, thus improving the performance of the battery and improving the explosion prevention feature of Applicants' invention.

The INOUE et al. publication teaches a battery having a generally oval sealing plate. As recognized by the Examiner, INOUE et al. fails to teach or suggest a battery having a thickness of 4mm or more and an aspect ratio of 3 or more, and an intersecting point between a circular part and a linear part in an interface between said battery case and the sealing plate that acts as a breakage point for gas discharge.

The KAGEYAMA publication is directed to a battery having a thickness of 4.5mm and a width of 34mm. The KAGEYAMA battery is "flat and rectangular". See paragraph [0068]. KAGEYAMA fails to teach or suggest a battery having a generally oval cross section and a generally oval sealing plate.

There is nothing in the INOUE et al. or KAGEYAMA publications that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 1 under 35 U.S.C. § 103(a), and thus, the only reason to combine the teachings of INOUE et al. and KAGEYAMA results from a review of Applicants' disclosure and the application of impermissible hindsight.

Further, the ENDO publication is directed to a rectangular battery. As shown in the figures, the sealing plate 2 is rectangular with two long sides of the rectangle, two shorter sides of the

rectangle, and gently curved corners at the intersection points between the respective long sides and shorter sides. The ENDO sealing plate does not include a circular part, as does Applicants' sealing plate. Therefore, the ENDO sealing plate also does not include an intersecting point between a circular part and a linear part, as does Applicants' sealing plate.

However, even assuming, arguendo, that the gently curved corners of the ENDO sealing plate could be construed as circular parts, the ENDO sealing plate still does not include the intersecting point between the circular parts and the linear parts that act as a breakage point, as discussed in detail below. In this regard, the ENDO battery includes breakage points 8. The breakage points 8 are provided by forming a small amount of melting into the opening by a laser, after the sealing plate 2 is fitted onto the opening of the battery case. This breakage point 8 is easily separated when internal pressure is increased. ENDO teaches that the breakage points 8 could be positioned: (1) in the center of the short sides of the rectangle as shown in figure 2A; (2) directly on two opposite corners as shown in figure 2B; or (3) directly on four corners as shown in figure 2C. ENDO does not teach positioning breakage points 8 at an intersection between the curved corners and a side of the rectangular shaped sealing plate. Accordingly, even assuming, arguendo, that the curved corners could be construed as circular parts, the ENDO publication still does not teach the intersecting point between the circular parts and the linear parts that act as a breakage point.

Therefore, the ENDO publication fails to cure the deficiencies of the INOUE et al. device, and even assuming, arguendo, that the teachings of INOUE et al. and ENDO have been properly combined, Applicants' claimed generally oval battery including "a battery case having a generally oval cross section, a generally oval sealing plate, and an electrode plate assembly, said sealing plate having a U-shaped cross section, and said battery having a thickness of 4mm or more and an aspect

ratio of 3 or more, wherein an intersecting point between a circular part and a linear part in an interface between said battery case and the sealing plate acts as a point where breakage occurs for discharge of gas" would not have resulted from the combined teachings thereof.

Moreover, it is pointed out that Applicant's claimed invention includes a "battery having a thickness of 4mm or more and an aspect ratio of 3 or more, wherein an intersecting point between a circular part and a linear part in an interface between said battery case and the sealing plate acts as a point where breakage occurs for discharge of gas". Thus, in the instant invention, the combination of the generally oval battery case and sealing plate, the thickness of 4 mm or more, the aspect ratio of 3 or more, and the intersection of the linear part and the circular part, together provide the breakage point where breakage occurs for the discharge of gas. As disclosed in detail the instant specification, the generally oval battery case and sealing plate, the particular claimed thickness and aspect ratio, *combine* to provide the breakage point where breakage occurs for the discharge of gas, of Applicants' claimed invention.

Therefore, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 1 under 35 U.S.C. § 103(a) over INOUE et al. in view of KAGEYAMA and ENDO. In this regard, it is noted that the rejection includes a modification of the thickness and the aspect ratio from the KAGEYAMA reference, and the addition of a breakage point from the ENDO reference. Thus, two interrelated aspects of the claimed invention come from two different sources in the rejection. There is nothing in the prior art from which to conclude that it would have been obvious to make all of these modifications to arrive at Applicants' claimed invention. Further, there is nothing in the prior art to suggest that making all of the modifications suggested by the Examiner would combine to provide

the claimed invention. Thus, the only reason to combine the teachings of INOUE et al., KAGEYAMA and ENDO results from a review of Applicants' disclosure and the application of impermissible hindsight.

Accordingly, the rejection of claim 1 under 35 U.S.C. § 103(a) over INOUE in view of KAGEYAMA and ENDO is improper for all the above reasons and withdrawal thereof is respectfully requested.

Applicants submit that dependent claims 2-4, which are at least patentable due to their dependency from claim 1 for the reasons noted above, recite additional features of the invention and are also separately patentable over the prior art of record based on the additionally recited features.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection, and an early indication of the allowance of claims 1-4.

SUMMARY AND CONCLUSION

In view of the foregoing, it is submitted that the present response is proper and that none of the references of record, considered alone or in any proper combination thereof, anticipate or render obvious Applicants' invention as recited in claims 1-4. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

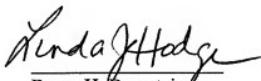
Accordingly, consideration of the present response, reconsideration of the outstanding Official Action, and allowance of all of the claims in the present application are respectfully requested and now believed to be appropriate.

Applicants have made a sincere effort to place the present application in condition for allowance and believe that they have now done so.

Should there be any questions, the Examiner is invited to contact the undersigned at the below listed number.

Respectfully submitted,
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March 14, 2008
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